

of *Saturn* at a lower altitude. This has occurred on different occasions, and is instanced on November 14, when, in the S.W. quadrant, the region bounded by the curved shading shown on Drawing VI. was of that character, and the whole region was whitish, the otherwise prevailing red tint being absent.

On every observing night this season the prevailing tint of the red portions of the planet has been much paler than during recent oppositions.

The general colour of the markings has appeared of a neutral gray, that of the most intensely marked portions inclining to bluish. Not the slightest trace of green has been detected.

The intense whiteness of the polar caps during August has gradually declined in purity of tint since then, becoming more nearly the same as the limb.

On all sides towards the limb the redness has always paled rapidly almost to white.

The six drawings accompanying these notes are selected from a series, and refer to nights when the best definition prevailed.

The longitudes appended are derived from Mr. Marth's Tables.

The instrument a Newtonian Equatoreal, speculum by With, of 8.15 in. aperture, diagonal prism of fine quality, power 400 single achromatic.

The Approximate Fraction Elements of Solar System.

By S. M. Drach, Esq.

In the weekly *English Mechanic* for June 16 and July 7, 1871, a writer signing himself G. F. H. gave remarkably close and simple approaches to the orbital mean distances and eccentricities, which I think ought to be specially recorded in the *Monthly Notices*. I have corrected the faulty 487 of *Saturn's* denominator, and extracted the factors:

Mercury	.3870981 - .0000013 =	$\frac{12}{31}$;
Venus	.7233316 +	$17 = \frac{217}{300}$, or $\frac{7.31}{10.30}$;
Earth	1 -	00 = 1;
Mars	1.5236923 -	$15 = \frac{611}{401}$, or $\frac{13.47}{401}$;
Jupiter	5.2027760 +	$18 = \frac{1873}{360}$, or $\frac{11.31.131}{6.27.53}$ true;
Saturn	9.5387861 -	$30 = \frac{4550}{477}$, or $\frac{5.7.13}{9.53}$;
Uranus	19.1823900 -	$01 = \frac{4051}{159}$, or $\frac{4051}{3.53}$;
Neptune	30.0566000 +	$40 = \frac{1593}{53}$, or $\frac{27.59}{53}$.

Remark the 1, 3, 9, 27 times 53.

For eccentricities.

Mercury	·2054925 - ·0000001	$= \frac{217}{1056}$	or	$\frac{7.31}{32.33}$
Venus	·0068722 +	$07 = \frac{2}{291}$	or	$\frac{2}{3.97}$
Earth	·0167918 -	$08 = \frac{9}{536}$	or	$\frac{9}{8.67}$
Mars	·0931125 -	$03 = \frac{73}{784}$	or	$\frac{73}{28.28}$
Jupiter	·0481626 -	$04 = \frac{38}{789}$	or	$\frac{2.19}{3.263}$
Saturn	·0561502 -	$05 = \frac{21}{374}$	or	$\frac{21}{17.22}$
Uranus	·0466683 -	$17 = \frac{7}{150}$	or	$\frac{7}{10.15}$
Neptune	·0084962 -	$00 = \frac{10}{1177}$	or	$\frac{10}{11.107}$

Nov. 1877.

On the Synodisms of Saturn's Satellites. By S. M. Drach, Esq.

In Mr. Christie's journal, *The Observatory* (No. 7, for last month), Mr. D. Kirkwood deduced from Lovnics' *Astronomy* (by adding 0^s.62 to period of *Mimas*) this interesting formula of the four innermost moons :

5 (n₁ - n₂) + (n₃ - n₂) + 4 (n₄ - n₂) = 0.

In this form I think it may lead to a theory akin to that arising from the relation to *Jupiter's* lunar $n_1 - 3n_3 + 2n_2 = 0$ between the mean motions of *Jupiter's* satellites. Recommended to try later elements for all, I have selected Guillemin's *Heavens* (English translation, 1876). Chambers' *Descriptive Astronomy* only gives the *minutes*; the columns of "days and decimals" could have been better replaced by the *seconds* of time. (*Saturn's* rotation, 10^h 29^m 17^s).

		Period.				In Sat. days.	Rev. in Sat. year.
		d	h	m	s		
I.	M.	0	22	37	23	2.157305	11414.08
II.	E.	1	08	53	07	3.135499	7852.185
III.	Te.	1	21	18	26	4.319888	5699.331
IV.	D.	2	17	41	09	6.262918	3931.155
V.	R.	4	12	25	11	10.33745	2381.678
VI.	Ti.	15	22	41	25	36.48820	675.2189
VII.	H.	22	07	07	41	51.02262	482.5411
VIII.	J.	79	07	54	40	181.5310	135.6271
	☉	10759 ^d .22				24625.1	unity